United States Department of Agriculture
Agricultural Research Administration
Bureau of Entomology and Plant Quarantine
Washington 25, D. C.

COOPERATIVE ECONOMIC INSECT REPORT

Vol. 1 SUMMARY OF INSECT CONDITIONS IN 1951 No. 7

Contents

CEREAL AND FORAGE INSECTS

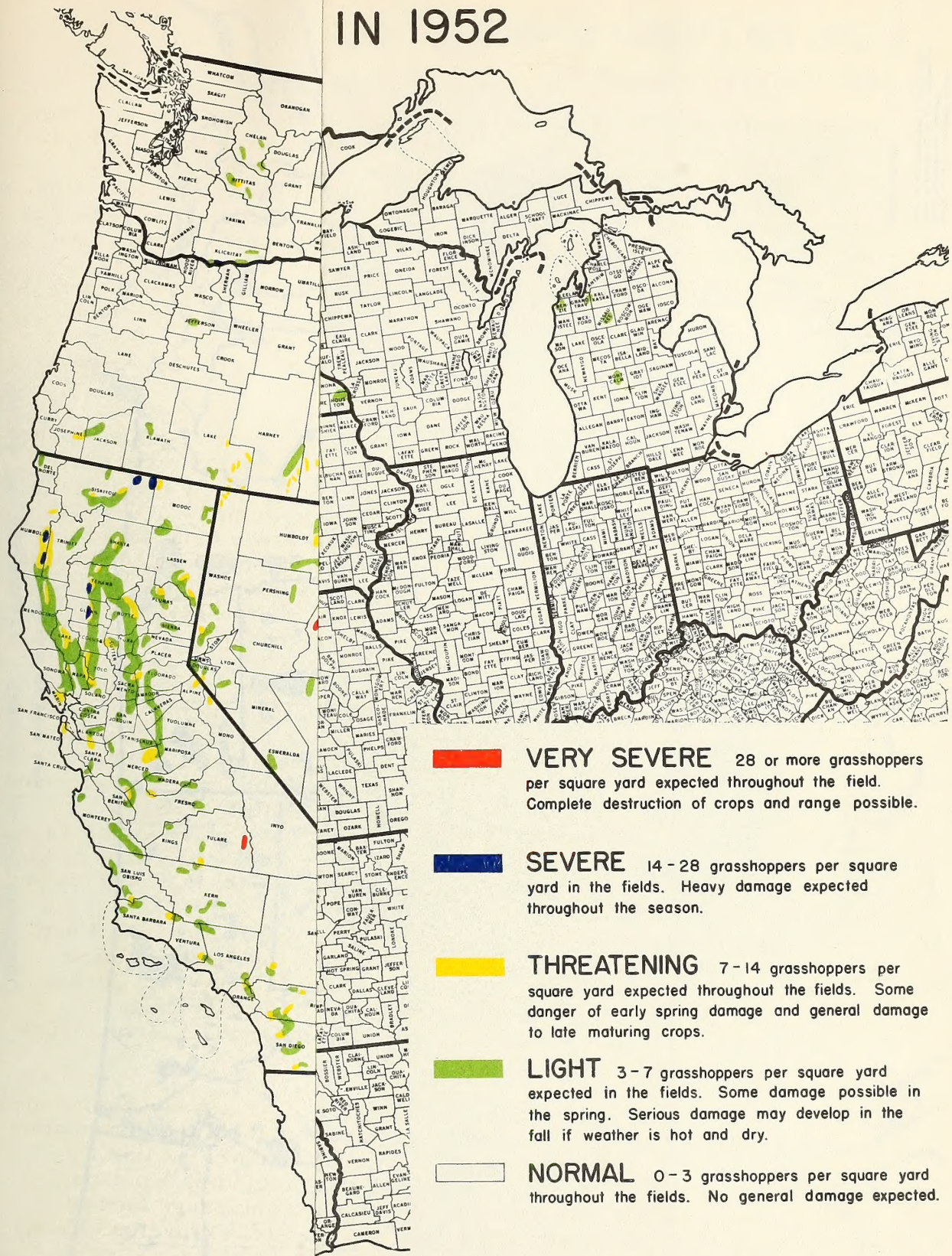
GRASSHOPPERS (Acrididae)--Grasshopper populations in 1951 were not exceptional in most areas. Weather conditions were credited with limiting grasshopper development in several states. In North Dakota the large numbers of grasshoppers expected hatched at about a normal time. Shortly thereafter, cold, wet weather set in and persisted for an extended period. When the weather finally cleared most of the grasshoppers had failed to survive. This may have occurred in parts of Montana and Minnesota. Very dry weather in parts of Arizona limited grasshopper infestations greatly. On a section of the San Carlos Indian Reservation, heavy egg deposits were known to exist on large range areas. Because of the drouth the eggs were desiccated in many sections of the Reservation, resulting in no economic infestations.

There were only a few areas in which increased numbers of grasshoppers were noted in 1951 as compared with the previous year. In many of the range areas in Nevada several species became increasingly important. Threatening to very severe infestations were found in eight of Nevada's 17 counties. Large sections of western Nebraska range land and crops support high populations of grasshoppers. Second generation Melanoplus mexicanus (Sauss.) were responsible for increased infestations in western Kansas. These grasshoppers were also numerous in the Texas and Oklahoma panhandles, eastern Colorado, and western Nebraska. In the Klamath Basin of southern Oregon and northern California, severe infestations of Camnula pellucida (Scudd.) and Melanoplus mexicanus devastator (Scudd.) infested range and crop lands. The high populations of grasshoppers that have been present in Idaho for several years did not lessen during 1951. Forest Service range lands in the Big Horn Mountains of northern Wyoming are infested with Chorthippus longicornis Latr., Melanoplus alpinus Scudd., M. mexicanus, and M. borealis (Fieber). These grasshoppers have severely depleted the mountain range lands. In an area in central South Dakota where heavy populations of M. differentialis (Thos.) were present in 1944 through 1946, that species and M. bivittatus (Say) are again increasing in numbers.

Population decreases from 1950 were noted in Arizona, Montana, North Dakota, Minnesota, Wyoming, Texas, New Mexico, and parts of other states. The size of the area infested with Melanoplus rugglesi Gurney remained about the same but the infestation now lies principally in southern Oregon with small extensions into Nevada and California. (See map on infestation expected in 1952).

During the annual adult survey many collections of grasshoppers are made. From these collections, much valuable information about the distribution of species is gained. The collections made in 1951 revealed that C. pellucida has increased locally in several states, including Montana, California, Utah, Nevada, and Oregon. On much of the range land in north-central and south-eastern Montana, Aeropedellus clavatus (Thos.)

IN 1952



VERY SEVERE 28 or more grasshoppers per square yard expected throughout the field. Complete destruction of crops and range possible.

SEVERE 14 - 28 grasshoppers per square yard in the fields. Heavy damage expected throughout the season.

THREATENING 7 - 14 grasshoppers per square yard expected throughout the fields. Some danger of early spring damage and general damage to late maturing crops.

LIGHT 3 - 7 grasshoppers per square yard expected in the fields. Some damage possible in the spring. Serious damage may develop in the fall if weather is hot and dry.

NORMAL 0 - 3 grasshoppers per square yard throughout the fields. No general damage expected.

STIPPLING Infestations are local in character, confined to single fields or preferred habitats in the area.

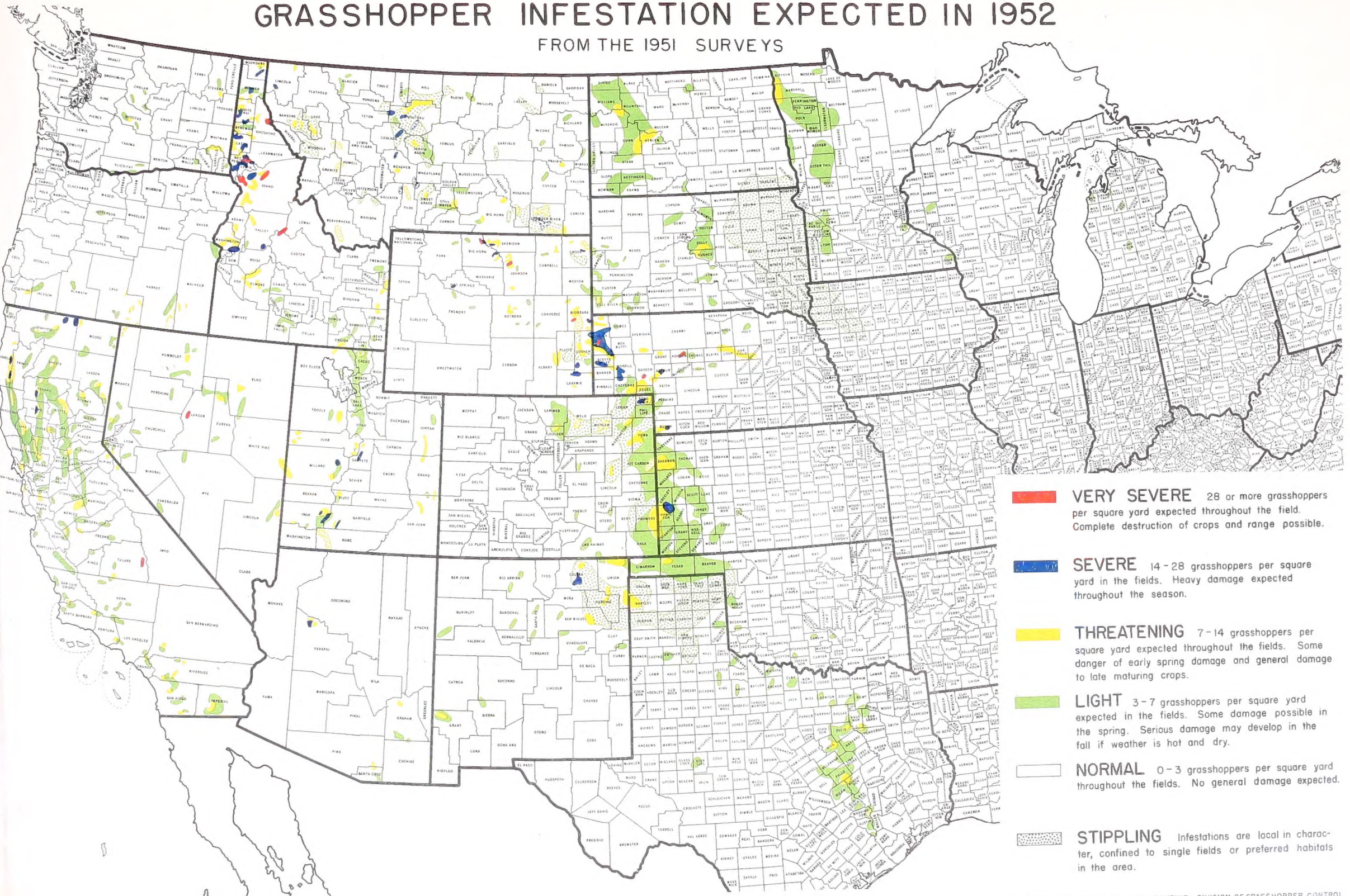
CULTURE, BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE, DIVISION OF GRASSHOPPER CONTROL

51

GPO 82-9000392

GRASSHOPPER INFESTATION EXPECTED IN 1952

FROM THE 1951 SURVEYS



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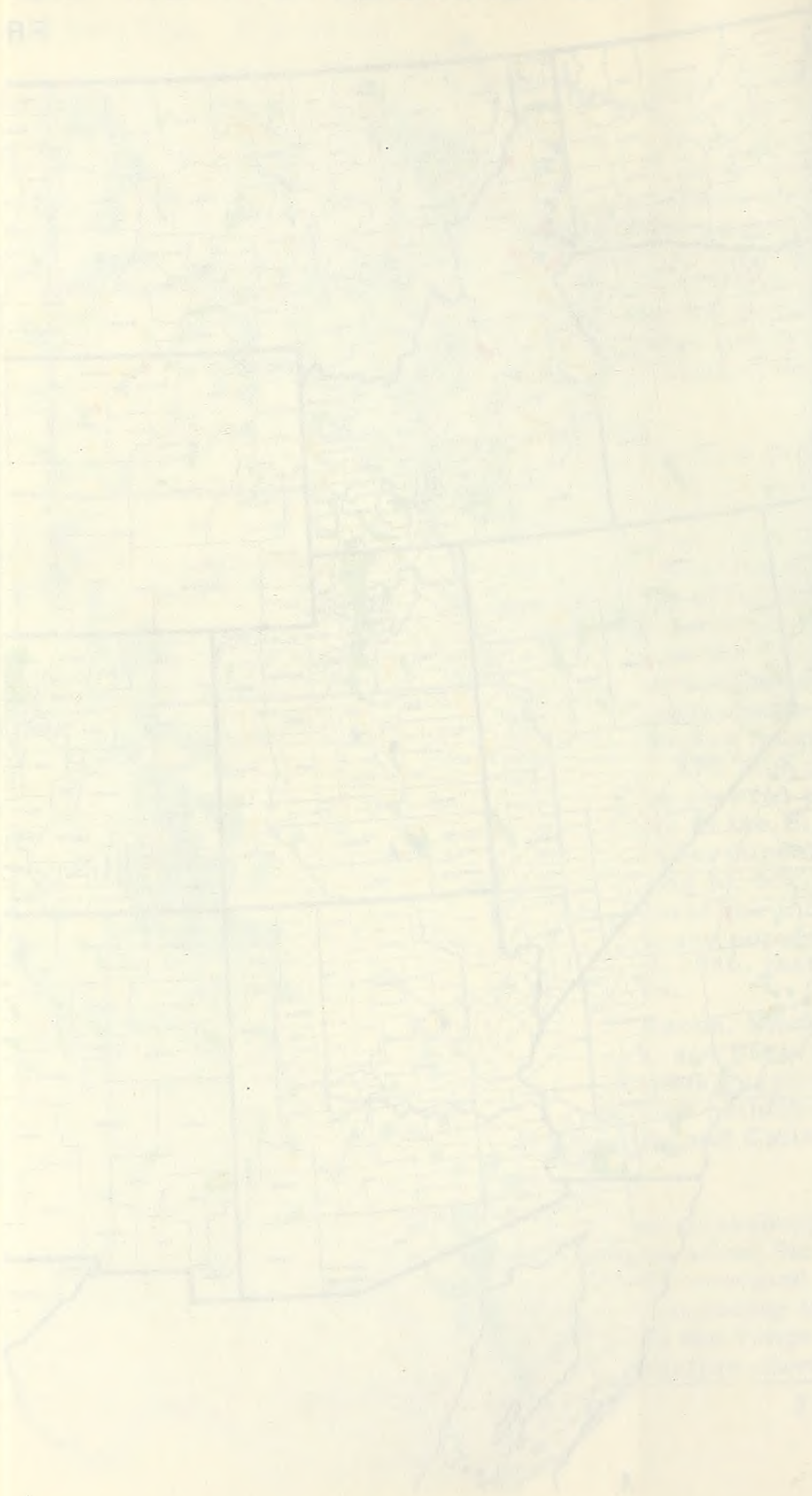
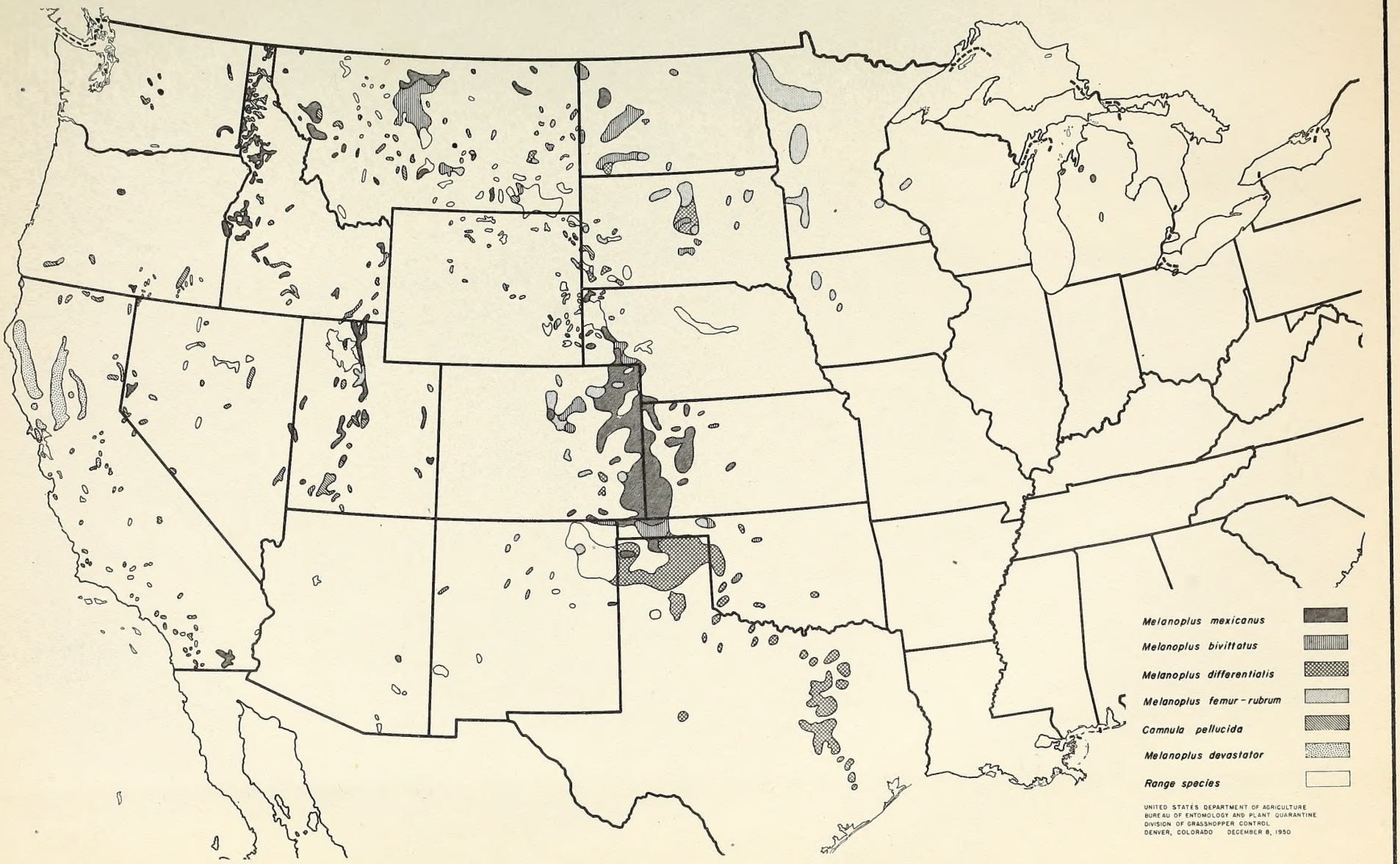
UNITED STATES DEPARTMENT OF AGRICULTURE, BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE, DIVISION OF GRASSHOPPER CONTROL
DENVER, COLORADO, DECEMBER 7, 1951

GPO 82-9000392



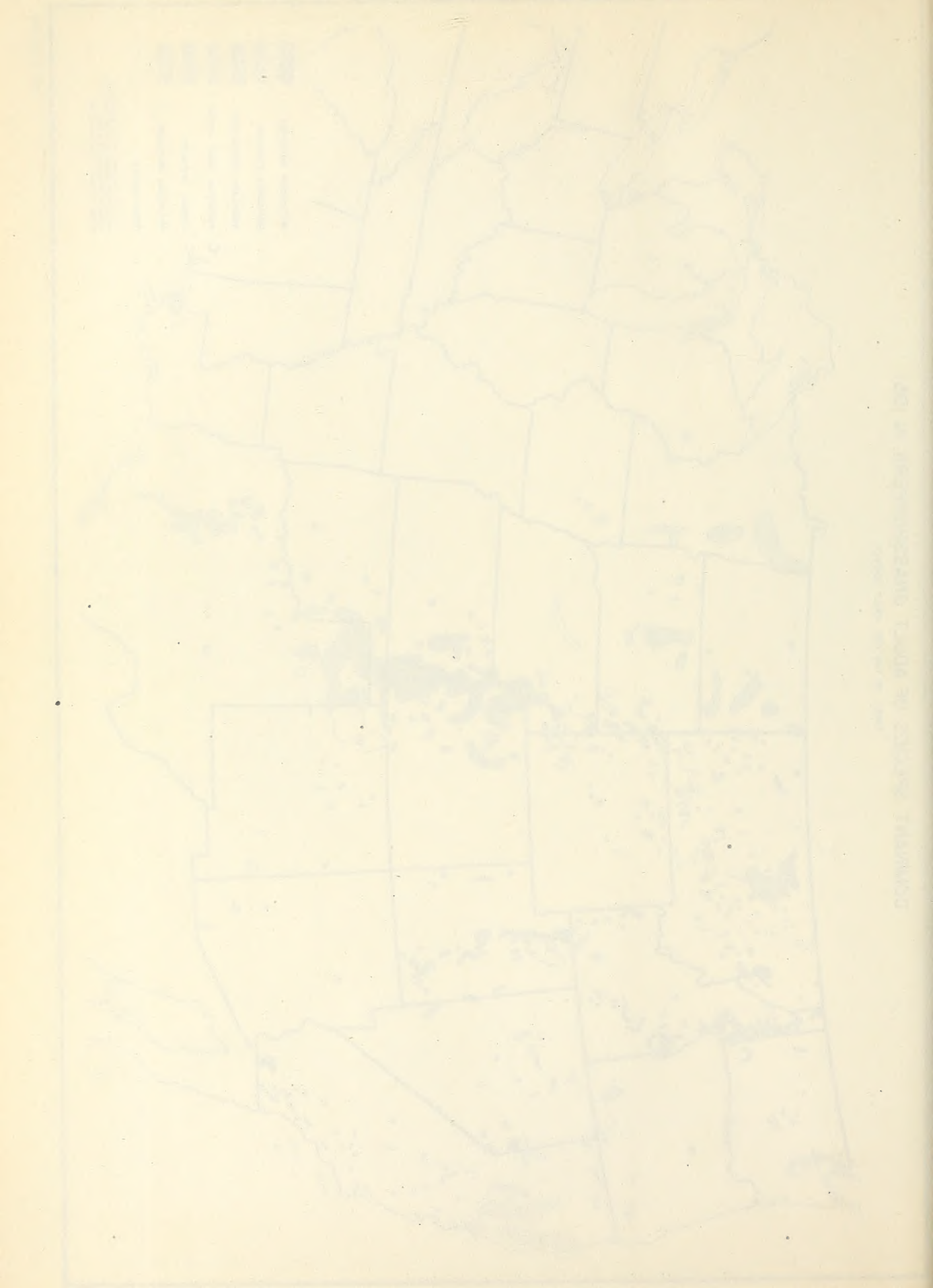
DOMINANT SPECIES OF ADULT GRASSHOPPERS IN 1951

BASED ON THE 1951 ADULT SURVEY

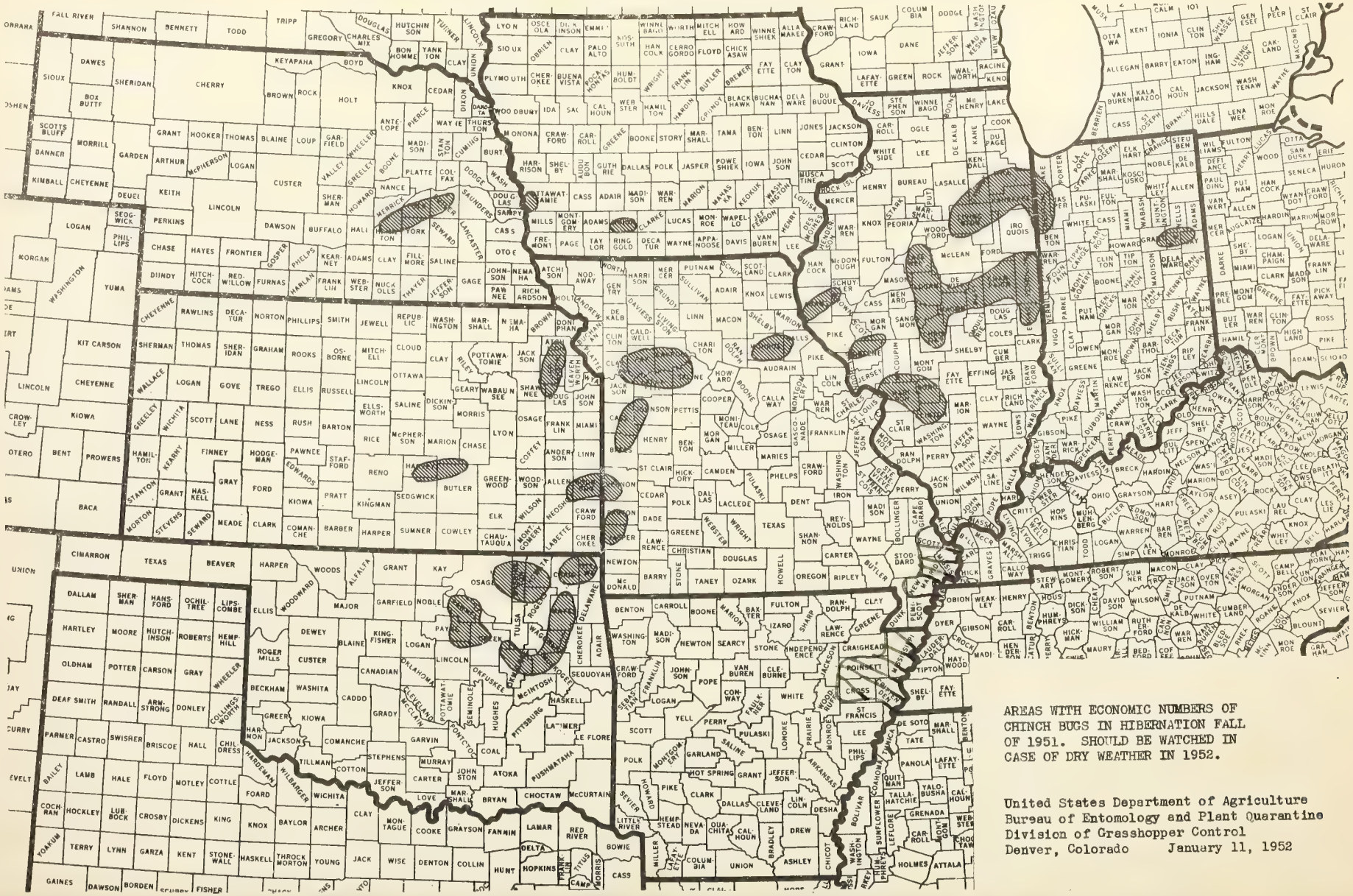


UNITED STATES DEPARTMENT OF AGRICULTURE
BUREAU OF ENTOMOLOGY AND PLANT QUARANTINE
DIVISION OF GRASSHOPPER CONTROL
DENVER, COLORADO DECEMBER 8, 1950

GPO 82-9000429



CHINCH BUG INFESTATION IN FALL OF 1951



AREAS WITH ECONOMIC NUMBERS OF CHINCH BUGS IN HIBERNATION FALL OF 1951. SHOULD BE WATCHED IN CASE OF DRY WEATHER IN 1952.

United States Department of Agriculture
Bureau of Entomology and Plant Quarantine
Division of Grasshopper Control
Denver, Colorado January 11, 1952

was the dominant species on range lands. There has apparently been a very great increase in the numbers of this species. As recently as two years ago they were only infrequently taken in collections. Many species compose the complex that infests the range lands of Nevada. Most numerous among these are C. pellucida, Aulocara elliotti (Thos.) and Cratypedes neglectus (Thos.). On a large range area in Yavapai County, Ariz., Melanoplus gladstoni Scudd. was found to be the dominant species. In most other areas the dominant species were generally the same as was reported in the Summary for 1950. (See map on dominant species of adult grasshoppers in 1951).

Range lands in western Nebraska again were severely infested with moderate to severe populations of grasshoppers. Moisture was plentiful throughout the season in the area and although grasshoppers did considerable damage to the range, the damage was obscured by the abundant growth of the vegetation. Range in northeastern Colorado was similarly infested during the season. (J. R. Dutton, BEPQ).

MORMON CRICKET (Anabrus simplex Hald.)--Control of these insects in 1951 was performed in Colorado, Nevada, Washington, and Utah. For the first season since 1937 no work was necessary in Oregon. Infestations in Nevada definitely increased during the year and some 200,000 acres are expected to be infested in 1952. (J. R. Dutton, BEPQ).

CHINCH BUG (Blissus leucopterus (Say)) Chinch bug populations continued to be low in 1951. Economic populations were found in Illinois, Indiana, Iowa, Kansas, Missouri, Nebraska, and Oklahoma. The unprecedented flooding conditions in Kansas undoubtedly influenced the populations in that state. Elsewhere bugs were numerous only in restricted areas and control was not necessary in many instances. (See map, corrected to include Scott, Mississippi, and New Madrid Counties, Mo. and Mississippi, Poinsett, Cross, and Crittenden Counties, Ark.) (J. R. Dutton, BEPQ).

GREENBUG (Toxoptera graminum (Rond.)) --The infestation was very severe especially in southwestern and central Oklahoma during January. February and March 1951. These insects migrated by flight into North-central and North-eastern Oklahoma during March and April. This infestation was accompanied by drought, and it was impossible to separate greenbug damage from drought damage. The Oklahoma Extension Entomologist estimated that 1,413,830 acres was destroyed by greenbugs and 1,725,287 acres were sprayed for greenbug control in Oklahoma. Greenbug infestation was very light during October, November, and December 1951 throughout the hard red winter wheat area except in a few fields in Northeastern Oklahoma and Eastern Kansas. (R. G. Dahms, BEPQ).

There was considerable damage to small grain crops in Texas during 1951, particularly to wheat in the High Plains area. Greenbug surveys were made in November and December throughout most of the small grain area of the state, and the infestation was found to be very light. During the summer a survey had been made by the Texas Agricultural Experiment Station to determine hosts other than the small grains, but practically no infestations were found. Out of 425 field inspections made in 71 counties, very light greenbug infestations were found in 3 counties. As of December 1, greenbugs are very difficult to find anywhere in the state. The decline in populations probably can be attributed to the very high temperatures and the prolonged, severe drought which were experienced during 1951. (H. L. Chada, BEPQ).

HESSIAN FLY (Phytophaga destructor (Say))--A general survey of wheat fields at harvesttime showed hessian fly infestations moderate to high in western New York, southern Indiana, and southeastern and northwestern Kansas; and infestations moderate to low in central Maryland, northern Virginia, northern Indiana, central and southeastern Wisconsin, southeastern and central Kansas. (Wm. B. Cartwright, BEPQ).

WHEAT JOINTWORM (Harmolita tritici (Fitch))--A general survey of wheat fields at harvesttime showed jointworm infestations heavy in central Maryland, northern Virginia, western New York, southern Indiana, southern Illinois and in some fields in eastern Missouri. Infestations were attended by low yields in many fields and made jointworm a major pest in 1951. (Wm. B. Cartwright, BEPQ).

WHEAT STEM SAWFLY (Cephus cinctus Nort.)--The seasonal development of the wheat stem sawfly was delayed from one to two weeks during 1951 throughout the important sawfly area of the northern Great Plains. This lag was attributable to a wet spring and cool weather during much of the growing period. Aside from causing this delay, the cool weather had little effect on this insect. Wet fall weather prevented an early harvest which in turn allowed sufficient time for most of the infested wheat stems to fall to the ground. This situation resulted in a greater grain loss than normally. A survey of the wheat fields in Montana east of the Rocky Mountains, North Dakota and parts of South Dakota and Wyoming during October and November revealed an increase of the economic sawfly area since 1948. The greatest increase occurred in northwestern Montana east of the mountains and in central and eastern North Dakota. A search for the sawfly in wheat in counties contiguous to the known wheat infested territory resulted in the addition of the following counties: Montana - Lewis and Clark; South Dakota - Potter; Nebraska - Sheridan, Dawes, Sioux, Box Butte, Scotts Bluff, Banner, Morril, Kimball and Cheyenne. (E. G. Davis, BEPQ).

WHEAT STEM MAGGOT (Meromyza americana Fitch)--The wheat stem maggot is abundant in some fields in western Missouri and eastern Kansas. Infestations are generally light in western and central Kansas. Some spotted infestations have been noted in central Kansas. (E. T. Jones, BEPQ).

A FLEA BEETLE (Chaetocnema sp.)--In October and November 1951 reports of damaging infestations to wheat by a flea beetle identified as Chaetocnema sp. were received from the district around Amorillo, Tex. In most instances the infestations were found around dry, shallow lakes, and the insects appeared to have radiated out from such locations. In Gray County, Tex., one field was observed in which at least 40 acres of the wheat were destroyed. However, with the advent of cool weather and some rain, all damage ceased and the flea beetles disappeared. This infestation appears to have resulted by the adoption of wheat as host plant by the insect in the absence of the regular host plants. (H. L. Chada, BEPQ).

A flea beetle, Chaetocnema probably pulicaria Melsh., was reported damaging wheat in Greeley, Stanton, Haskell, Gray, and Meade Counties in Kansas in September and October, 1951. (R. G. Dahms, BEPQ).

EUROPEAN CORN BORER (Pyrausta nubilalis (Hbn))--See Status of the European corn borer in 1951, Cooperative Economic Insect Report, Vol. 1, Special Report No. 3, Feb. 1, 1952; Estimates of Damage by the European Corn Borer to Grain Corn in the United States in 1951, Special Report No. 5, Feb. 26, 1952.

ALFALFA WEEVIL (Hypera postica (Gyll.))--Infestations were heavier than usual in Modoc and Lassen Counties, Calif. in the spring of 1951, requiring insecticide treatments. Light, nondamaging infestations occurred also in the Tracy area. Also observed to be abundant in the Fallon, Yerington and Minden areas in Nevada, requiring treatment. (M. Schlosberg, BEPQ).

In Utah damage by the alfalfa weevil was light. The first growth of alfalfa on most hay acreage became mature enough to cut before economic injury threatened. Most seed acreage was adequately protected by application of insecticides. Weather during harvest was favorable to good cultural kill, and prospects for light damage in 1952 are good. (F. V. Lieberman, BEPQ).

AN ALFALFA WEEVIL (Hypera brunneipennis (Boh.))--The Egyptian alfalfa weevil was more abundant, caused more damage to alfalfa, and was more widely dispersed in the agricultural area south, southeast, and southwest of Tempe, Ariz., in late winter and early spring of 1951 than in any previous year. One crop in an 80-acre field about 3½ miles southwest of Tempe was practically destroyed. (O. L. Barnes, BEPQ).

ALFALFA CATERPILLAR (Colias philodice eurytheme Bdvl.)--Severe and damaging infestations occurred in the Antelope Valley in California, continuing abnormally into late September with consequent need for continued insecticidal control measures. No treatment was required in October. In general, however, the infestations, although damaging, were lighter than average in the Hemet and Imperial Valleys and at Blythe. The infestations in the counties surrounding Sacramento were less severe than usual and no control treatments were needed. (M. Schlosberg, BEPQ).

PEA APHID (Macrosiphum pisi (Kltb.))--Unusually severe infestations occurred on alfalfa in the vicinity of Susanville, and the Antelope and Imperial Valleys in California and in the vicinities of Fallon, Yerington and Minden in Nevada. Generally, where control measures were not used severe damage to the alfalfa occurred. Heavier than usual infestations occurred in the vicinity of Sacramento, Calif., but with little commercial significance. In the Antelope Valley the abundance peak occurred earlier in the season than normal, followed by control by natural agencies to an extent to necessitate less insecticidal control and earlier stoppage. On the other hand, fall populations increased above normal to an extent to require some insecticidal control in alfalfa hay crops. At Susanville the near absence of predators may have contributed to the severity and persistance of the infestation. (M. Schlosberg, BEPQ).

CLOVER SEED WEEVIL (Miccotrogus picirostris (F.))--Specimens were collected on alsike clover south of Perrysbury, Wood County, Ohio, June 4, 1951 and on red clover near Decatur, Adams County, Ind., in August 1951. These are the first records from these states. (Compiled from reports in the Insect Pest Survey).

Severe damage by this insect was averted by the use of DDT in the northern counties of California. No new infestations were recorded in 1951. (M. Schlosberg, BEPQ).

SWEETCLOVER ROOT BORER (Walshia amorphella (Clem.))--During the past three years the sweetclover root borer, Walshia amorphella has been reported to be doing considerable damage to biennial sweetclover in northern Texas. While larval populations in November and December were somewhat lower than they were in 1950, the infestation is such that serious damage can be expected in the spring of 1952. M. J. Norris, Agronomist, Texas Agricultural Experiment Station, Denton, found an average infestation of 47.0 per cent in his sweetclover plots, with a high of 79.0 per cent in one replicate. Other fields in the area appear to be similarly infested. Biennial sweetclover is an important crop in the small-grain rotation, but there are indications that the sweetclover root borer may be a limiting factor in its use. The infested area at the present time is rather small, but it is believed that this insect should be watched carefully, because it may become a serious pest over a large area. (H. L. Chada, BEPQ).

RHODES-GRASS SCALE (Antonina graminis (Mask.))--Populations of the Rhodes-grass scale were considerably lower than they were in 1950. Except for a few lawns and golf courses, there was practically no damage of economic importance in the infested area in the United States. The reduction in populations can be attributed to the severe freezing winter weather during January and February, followed by very high temperatures and prolonged severe drought during the summer. The scale has practically become extinct on range lands in southern Texas because of these unfavorable conditions. (H. L. Chada, BEPQ).

SUGARCANE BORER (Diatraea saccharalis (F.))--The winter of 1950-51 was the coldest since 1899 in the sugarcane area of Louisiana and the borer population surviving was the lowest on record. As a result, the infestation was so light in 1951 that no commercial insecticide applications for sugarcane borer control were made during the year. A survey of the infestation in Louisiana sugarcane fields was conducted at harvesttime in cooperation with the Entomology Department of the Louisiana Agricultural Experiment Station. The same system of survey was followed as has been used annually since 1935. Based on this survey the average estimated percentage of joints bored was 6.7 as compared with an average of 14.7 for the period 1935-1950. The 1951 infestation was the second lowest on record; the only lower one being 5.3 percent in 1940.

In the annual harvesttime borer injury survey conducted in Florida, in cooperation with entomologists of the Everglades Experiment Station, an average of 2.8 percent of the joints were found bored in the Fellsmere area in 1951 as compared with 6.2 percent in 1950. In incomplete surveys in other sugarcane districts of Florida the average percentages of joints bored in 1951 and 1950 were: Canal Point 1951 - 8.4, 1950 - 7.8; Clewiston 1951 - 3.6, 1950 - 2.8; and Okeelanta 1951 - 2.8, 1950 - 0.8. (J. W. Ingram and R. Mathes, BEPQ and A. L. Dugas, La. Agr. Exp. Sta.)

SOUTHERN CORN ROOTWORM (Diabrotica undecimpunctata howardi Barb.)--Injury to peanuts in southeastern Virginia was less severe than in 1950. Dry weather in July was apparently responsible for the less than usual abundance of the insect. (F. W. Poos, BEPQ).

FRUIT INSECTS

ORCHARD MITES--The development of more effective acaracides than were formerly available and their general use by orchardists served to hold mite injury to moderate or lower levels in most orchards in all fruit-growing areas throughout the United States during 1951. The variety of species involved, their widespread distribution and unpredictable habits caused them to be the problem of most concern to most apple growers. The European red mite (Paratetranychus pilosus (C. & F.)) was the most abundant species in northern Kentucky, Indiana, eastern Illinois, West Virginia and Ohio. It caused bronzed foliage in some orchards in New Jersey, Delaware, and Massachusetts. The two-spotted spider mite (Tetranychus bimaculatus Harvey) was abundant in some orchards in the lower Hudson Valley and Niagara County, New York, was generally present in Massachusetts orchards, more abundant than usual in Delaware, fairly abundant in Pennsylvania, moderately abundant in West Virginia and Virginia and required control in some orchards in Illinois and Missouri. The Schoenei mite (T. schoenei McG.) predominated in portions of Virginia. Mites caused little injury of importance in the Pacific Northwest because of the general use of control measures but of particular interest was the appearance of two resistant species in the Yakima Valley in 1951. One of these was the European red mite and the other, first identified as T. mcdanieli McG. may be a strain of the Pacific mite (T. pacificus McG.).

E. J. Newcomer reported the following species known to occur in Yakima Valley, Wash.:

Tetranychidae:
Tetranychus bimaculatus Harvey (two-spotted mite) on all fruits.
T. pacificus McG. (Pacific mite) mostly on apple and pear.
T. borealis Ewing (flavus Ewing) (yellow mite) on apple, pear, and cherry.
T. mcdanieli McG. (?) on apple.
Paratetranychus pilosus C. & F. (European red mite) on all fruits.
P. newcomeri McG. on pear.
Bryobia praetiosa Koch (clover mite) on all fruits.

Eriophyidae:
Eriophyes pyri Pgst. (pear leaf blister mite) on apple and pear.
Vasates cornutus Banks (peach silver mite) on peach.
V. schlechtendali Nal. (apple rust mite) on apple and pear.
V. fockeui (Nal. & Trt.) (nursery plum mite) on plum and prune.

The Eriophyids were identified by Mr. H. H. Keifer, of the California State Department of Agriculture. (Division of Fruit Insect Investigations, BEPQ).

CODLING MOTH (Carpocapsa pomonella (L.))--Populations of this insect and injury caused by it were generally light in all important fruit-growing areas in the United States in 1951 although there were indications of increasing injury late in the season in scattered orchards in the Cumberland-Shenandoah area, in the Middle West and in the Pacific Northwest. There is no concrete evidence, as yet, that the codling moth is becoming resistant to DDT but there are indications that some growers complete their DDT spray program too early in the season. The hibernating population is light, but a little larger than last year in most areas. (H. Baker, BEPQ).

PLUM CURCULIO (Conotrachelus nenuphar (Hbst.))--No reports were received during the year of serious injury to apples or peaches in well-cared-for orchards. Injury throughout the area of infestation generally ranged from very light to light. (H. Baker, BEPQ).

RED-BANDED LEAF ROLLER (Argyrotaenia velutinana (Wlkr.))--Infestations were widespread but not generally severe in most apple-growing areas in the eastern half of the United States in 1951. The principal areas of greater than usual abundance included Massachusetts, New Jersey, and Missouri. Injury was light to moderate in parts of Illinois, Indiana, New York and the Cumberland-Shenandoah Valley and severe in a few orchards in northeastern Ohio. In a questionnaire survey in Indiana, injury to fruit was reported as less than 2 percent by 30 percent of the growers and as over 10 percent by 22 percent of the growers. Sixty percent of the growers reported more injury than in 1950 and 18 percent less injury. Infestation in peaches ranged from very light to light and was restricted to scattered localities. (H. Baker, BEPQ).

ORIENTAL FRUIT MOTH (Grapholitha molesta (Busck).--Again, as during the last few years, injury to peaches was generally very light to light in sprayed orchards and only occasionally heavier than moderate in unsprayed orchards. Twig injury was reported as moderate and heavier than in the last two years in a few orchards in Massachusetts, a heavy flight of late moths occurred in the Yakima Valley, Wash. but there was very little injury to fruit, and injury was very light to light in the Cumberland-Shenandoah Valley, Georgia, Indiana, and Ohio. In Illinois light to moderate injury occurred in a few orchards and in central Missouri injury was heavy in a few unsprayed orchards. In New Jersey 22 percent of the fruit was injured in unsprayed orchards in which harvested fruit samples were examined as compared to 3.8 percent in orchards in which

control measures were carried out. Reports indicate that the oriental fruit moth is becoming an increasingly important pest of apples in parts of North Carolina.--(H. Baker, BEPQ).

VEGETABLE INSECTS

VEGETABLE WEEVIL (Listroderes costirostris obliquus Klug)--The vegetable weevil caused moderate to heavy damage to beans cabbage, collards, kale, lettuce, mustard, potato, radish, spinach, tomato and turnip in widely separated districts of the Atlantic Coast region extending from Virginia to Louisiana, and in California, at various times during the winter, spring and fall of 1951. In Florida, and to a lesser extent in North Carolina and South Carolina the vegetable weevil injured tobacco seedlings in plant beds and in some instances damaged the small plants after they were set in the field. (G. J. Haeussler, BEPQ).

WHITE-FRINGED BEETLES (Graphognathus spp.) Populations were lower in all of the infested areas during 1951 than at any time since their discovery in this country. These reduced populations are largely attributable to the effective control work. The extreme drought which occurred throughout the South during the spring and early summer delayed emergence by several weeks and resulted in an unusually heavy egg deposition in the fall. Since the percent of survival of fall-hatched eggs is usually much higher than for those hatched during the summer, some increase of larval populations in untreated fields during the spring of 1952 can be expected. (W. G. Bruce, BEPQ).

SEED-CORN MAGGOT (Hylemya cilicrura (Rond.))--The seed-corn maggot caused moderate to serious injury during 1951 to some fields of beans in Maine, New York, Delaware, Maryland, South Carolina, Nebraska, Utah, Idaho, California and Washington; to spinach, cucumbers, and onions in California; to potatoes in Nebraska and to various vegetables in Wisconsin. (G. J. Haeussler, BEPQ).

LEAF MINERS (Liriomyza spp.)--Leaf miner infestations in cantaloups in the Salt River Valley of Arizona, were never great enough to be of economic concern in 1951. This insect was subjected to a high degree of parasitization on all host plants during January and February 1951. Consequently the numbers infesting cantaloups during the spring were low and several species of Chalcid parasites continued to hold populations at a low level in cantaloups. In some fields populations of leaf miners increased just prior to harvest only to be again reduced by these parasites.

Leaf miners infesting fall-planted lettuce and broccoli also were subjected to a high degree of parasitization. (O. A. Hills and Edgar A. Taylor, BEPQ).

Leaf miners were present in most coastal tomato fields late in the summer and fall of 1951 in southern California but did not cause much damage except to a few fields in southern Orange and San Diego Counties. However, in some fields of cannery tomatoes there was sufficient damage to the foliage to expose the fruit to the sun, and considerable damage from sunburn resulted. (R. E. Campbell, BEPQ).

Leaf miners were also reported during 1951 as damaging various vegtables including beans, table beets, sugar beets, broccoli, cabbage, cantaloup, cauliflower, celery, collards, cucumber, eggplant, kale, lettuce, mustard, onions, peas, pepper, potato, radish, romaine, spinach, squash, tomato, turnip and watermelon in parts of Delaware, South Carolina, Florida, Wisconsin, Texas, California and Washington.

PEA LEAF MINER (Liriomyza langei Frick).--The pea leaf miner was a serious pest on spinach, table beets, romaine, lettuce and endive during the summer of 1951 in southern California. A field of celery in Ventura County was so badly damaged that the loss to the grower was $25,000. Early spring peas were damaged by the leaf miner, and young pea plants by the adult feeding punctures. The infestation on sugar beets was not so severe during 1951 as it was in 1950. (R. E. Campbell, BEPQ).

SPINACH LEAF MINER (Pegomyia hyoscyami (Panz.).--This insect caused considerable damage to fields of spinach and table beets grown for the fresh market in California. (R. E. Campbell, BEPQ).

RED SPIDER MITES on truck crops--Red spider mites, particularly the two-spotted spider mite (Tetranychus bimaculatus Harvey) was very abundant and destructive during 1951 on various truck crops. Beans, sugar beets, cantaloup, celery, eggplant, potato, sweetpotato, tomato and watermelon were reported as being severely infested at various times during the season in New York, New Jersey, Delaware, Maryland, Virginia, South Carolina, Georgia, Florida, Alabama, Louisiana, Utah, Idaho, Washington, California and Arizona. Strawberries were injured in Virginia, North Carolina, Florida, and California. In Washington, and California cane berries (brambles) and hops were affected by mites. (G. J. Haeussler, BEPQ).

MEXICAN BEAN BEETLE (Epilachna varivestis Muls.)--Infestations started later and the populations developed slower than usual during 1951. During mid-season those populations reached a normal level and were characterized as moderate to heavy in intensity, particularly in the absence of adequate insecticide treatment, throughout much of the territory comprising the coastal region extending from New York to Mississippi, as well as in the interior parts of South Carolina and North Carolina and locally in Tennessee and Ohio. Generally light infestations prevailed in Colorado, Wyoming and Nebraska but some garden plots not receiving insecticide applications sustained injury. In northern Utah and western Colorado, the infestations were more widely dispersed than usual and caused moderate to heavy damage in some fields. (G. J. Haeussler, BEPQ).

CORN EARWORM (Heliothis armigera (Hbn.) on beans--The corn earworm occurred in lesser numbers than usual on beans during 1951 but caused moderate to heavy injury locally at various times during the season in parts of California, Mississippi, Florida, Virginia and Tennessee. (G. J. Haeussler, BEPQ).

BEAN CUTWORM (Loxagrotis albicosta (Smith))--This insect injures bean seed by feeding through the pods into the developing and maturing seed. The injury to beans in the Rupert, Idaho, district was less in 1951 than in 1950. More moths of this cutworm were collected in a light trap at Twin Falls, Idaho, in 1951 than in previous years, indicating that the species is increasing its economic geographical range. (J. R. Douglass, BEPQ).

TOMATO FRUITWORM (Heliothis armigera (Hbn.))--Moderate to heavy infestations were reported at various times during 1951 in parts of the coastal districts ranging from New Jersey to Louisiana as well as in Tennessee and in the lower Rio Grande Valley of Texas and California. Lighter infestations occurred in New York and Ohio. (G. J. Haeussler, BEPQ).

HORNWORMS ON TOMATO--The tomato hornworm (Protoparce quinquemaculata (Haw.)) and the tobacco hornworm (P. sexta (Johan.)), occuring alone or in association, were locally abundant on tomato at various times during 1951 and caused serious damage in parts of New Jersey, Delaware, Maryland, Virginia, South Carolina, Florida, Mississippi and Tennessee. (G. J. Haeussler, BEPQ).

PLANT BUGS (Lygus hesperus Knight, L. elisus Van D., L. oblineatus (Say))--High populations on alfalfa and weeds in southern California in May and June, 1951 became the source of infestations of lima beans later. Light to severe damage occurred in many fields in the lima-bean-growing district. Lesser damage was done to blackeye beans. (R. E. Campbell, BEPQ).

APHIDS ON POTATO--In northeastern Maine, potatoes in 1951 were infested by four species of aphids. These were the green peach aphid (Myzus persicae (Sulz.)), the foxglove aphid (Myzus solani (Kltb.)), the potato aphid (Macrosiphum solanifolii (Ashm.)), and the buckthorn aphid (Aphis abbreviata Patch). Frequent, heavy rainfall prevented the beginning of insecticide applications as early as needed, and interfered with the maintenance of desired schedules of application throughout most of the summer. As a result aphid populations increased in many fields until about mid-August, when the development of large populations became a real likelihood in many fields. In most instances the aphid populations never became very large, however. They apparently began to drop soon after mid-August, even in fields of Kennebec potatoes not treated with insecticides. Late blight was unusually severe on potatoes during the latter part of the summer. While not all of the factors influencing these conditions are understood, weather conditions favoring the development of severe late blight conditions have been considered as not favoring the development of large aphid populations. (W. A. Shands, BEPQ)., and O. L. Wyman, Me. Agr. Ext. Serv.)

The green peach aphid (Myzus persicae (Sulz.)) was either scarce or only moderately abundant on early-crop potatoes and either moderately or extremely abundant on late-crop potatoes in the various potato-growing areas of the Northwest in 1951. Damage occurred during August and September. The potato aphid (Macrosiphum solanifolii (Ashm.)) was numerically less abundant and caused little direct injury but practically as many plants were as infested as with the green peach aphid. The aphid-transmitted leafroll disease was of minor importance on early-crop potatoes but net necrosis resulting from disease transmission caused a reduction of quality of some late crops. (B. J. Landis, BEPQ).

POTATO LEAFHOPPER (Empoasca fabae (Harr.))--Reports indicated that populations on beans were approximately normal during 1951. The species was present in varying abundance on beans in Florida during the late winter and early spring and later became moderately abundant and locally destructive in parts of Georgia, North Carolina, Virginia, Maryland, Delaware, New Jersey, New York, Tennessee and Ohio. Damage to potatoes was reported from Alabama, North Carolina, Delaware and Ohio. (G. J. Haeussler, BEPQ).

FLEA BEETLES ON POTATOES--The tuber flea beetle (Epitrix tuberis Gent.) was more abundant on potatoes in the Northwest in 1951 than either in 1949 or 1950. Larval infestations caused heavy cullage of some potato crops in Yakima and Kittitas counties of central Washington. Heaviest infestations were observed in second-year potato fields and especially in fields planted for September and October harvest. Surveys and reports indicate that this species has not spread eastward into the newly irrigated area of the Columbia Basin Project of central Washington. (B. J. Landis, BEPQ).

Populations of the tuber flea beetle on potatoes in the North Platte Valley in western Nebraska and eastern Wyoming were higher in 1951 than in any year since 1944. The average population for the season on early-planted potatoes (about May 1) was 43 adults per 100 sweeps of the insect net. The average population on medium-planted potatoes (about June 1) was 21 per 100 sweeps and on late-planted potatoes (about June 25) was 2.7. Populations averaging 2.7 per 100 sweeps occurred on tomatoes late in the season. Large populations averaging 10.8 per 100 sweeps occurred, late in the season, on late planted potatoes in northern Colorado. (R. L. Wallis, BEPQ).

In northeastern Maine overwintered adults of the potato flea beetle (Epitrix cucumeris (Harr.)) were abundant during 1951 on emerging potato plants in early-planted fields where the application of insecticides was not begun soon enough. In many fields frequent rains interfered with the starting of insecticide applications at the proper time and in maintaining desired application schedules. Adults of the summer generation were more abundant and destructive than usual in many fields, especially where planted to Kennebec potatoes to which no insecticides had been applied. Foliage damage by the beetles in such fields of Kennebecs was severe. (W. A. Shands, BEPQ, and O. L. Wyman, Me. Agr. Ext. Serv.).

POTATO OR TOMATO PSYLLID (Paratrioza cockerelli (Sulc))--Psyllid populations in Colorado, Wyoming and Nebraska potato growing areas were lighter in 1951 than for any previous year for which records are available. There was no apparent injury to potatoes or tomatoes. (R. L. Wallis, BEPQ).

IRIS WHITEFLY ON POTATOES--The iris whitefly (Aleyrodes spiraeoides Quaint.) was extremely abundant on potatoes in central Washington in 1951. During August and September infestations of eggs, larvae and pupae averaged nearly 100 per leaf in some fields in Kittitas County. Honeydew-like secretions of the larvae in heavily infested fields indicated that these insects caused direct damage to the plants. (B. J. Landis, BEPQ).

CATERPILLARS ON CABBAGE AND RELATED CROPS--Evidently as a result of an unusually severe winter and extensive use of insecticides for aphid control on cole crops, cabbage caterpillar infestations developed much later than normal on winter-spring crops of cabbage in South Carolina. Populations of the imported cabbageworm (Pieris rapae (L.)), and the diamondback moth (Plutella maculipennis (Curt.)), reached only moderate proportions and the cabbage looper (Trichoplusia ni (Hbn.)), was extremely scarce. In northcentral and northeastern South Carolina the cabbage looper was moderately abundant on cabbage and collards during the summer and early fall, and in the Charleston district this insect was extremely abundant on fall cabbage, cauliflower, collards, and broccoli. Infestations were so heavy in some commercial plantings that difficulty was experienced in controlling the looper with standard insecticides. Light infestations of the imported cabbageworm, the fall armyworm (Laphygma frugiperda (A. & S.)), and the corn earworm (Heliothis armigera (Hbn.)) were present on fall-grown cole crops but were apparently kept in check by insecticides applied for cabbage looper control. The cabbage webworm (Hellula undalis (F.)) became destructively abundant in some fall plantings of mustard and turnips, but in general damage was light. (W. J. Reid, Jr. and F. P. Cuthbert, Jr., BEPQ).

Cabbage caterpillars were sufficiently numerous at various times during 1951 to cause damage ranging from light to heavy on cabbage and related crops not treated with insecticides in many districts of the coastal region extending from New York to Louisiana as well as in parts of Tennessee, Ohio, Wisconsin, Nebraska, Texas, Arizona, California and Washington. (G. J. Haeussler, BEPQ).

CABBAGE LOOPER (Trichoplusia ni (Hbn.)) on lettuce, celery, and endive--The cabbage looper was particularly troublesome to fall-planted vegetables in the Salt River Valley in 1951. Heavy egg deposition occurred during the first week of September and continued through the first part of November. During this period some lettuce fields with plants in the four- to six-leaf stage of development had an average of 10 eggs per plant. Several insecticide applications were necessary in most fields owing to extensive and continuous egg deposition on new growth. In addition to cole crops, heavy infestations occurred on lettuce, celery, and endive. (O. A. Hills and E. A. Taylor, BEPQ).

APHIDS ON CABBAGE AND RELATED CROPS--A severe outbreak of the cabbage aphid (Brevicoryne brassicae (L.)) occurred on cabbage during March and April 1951. Extensive insecticide applications were necessary in order to check the insect and considerable damage was caused in plantings not receiving adequate insecticide applications. It appeared that the insecticides may have made the aphid more difficult to control by killing

its natural insect enemies. The cabbage aphid was also present in December 1951 in cabbage plant beds of the 1952 spring crop, but the infestations were light. The turnip aphid (Rhopalosiphum pseudobrassicae (Davis) was present during both the spring and the fall seasons of 1951 but damage was limited to an occasional planting of young cabbage or turnips. (W. J. Reid, Jr., and F. P. Cuthbert, Jr., BEPQ).

The turnip aphid and cabbage aphid, sometimes associated with the green peach aphid (Myzus persicae (Sulz.)), were reported in moderate to heavy numbers at various times during 1951 on such crops as cabbage, cauliflower, collards, broccoli, radish, rutabaga and turnips which were not properly treated with insecticides, in parts of the eastern and southern states and in Tennessee, Ohio, Utah, Idaho, Texas, California and Washington. (G. J. Haeussler, BEPQ).

HARLEQUIN BUG (Murgantia histrionica (Hahn))--Reports indicated that populations were locally moderate to heavy during the summer and fall of 1951 on such crops as broccoli, cabbage, collards, kale, mustard and turnips in Delaware, South Carolina, Georgia, Florida, Mississippi, Louisiana, Tennessee and Ohio. (G. J. Haeussler, BEPQ).

YELLOW-MARGINED LEAF BEETLE (Microtheca ochroloma Stal)--This insect was very abundant and caused serious damage to turnips in Jackson County, Miss. during April and June, 1951 and also injured turnips in Mobile County, Ala. during May. (G. J. Haeussler, BEPQ).

PEA APHID (Macrosiphum pisi (Kltb.))--In the Blue Mountain area of Washington and Oregon, the pea aphid was more abundant in 1951 than for the last two years. A high population of sexual forms in the fall of 1950 laid many eggs which produced a moderate population on alfalfa. The development of the aphids was aided by warm, dry spring conditions, and a fairly heavy movement to peas occurred during May. The aphids did not become sufficiently abundant to damage early peas, but many midseason and nearly all late pea fields had to be treated. Insecticides were used, with excellent results, on about 30 percent of the total acreage, and severe damage was averted. Pea aphid populations on alfalfa during summer and early fall were extremely low, but reached normal numbers during October. Around November 1, about 20 percent of the aphids were sexual forms, and many eggs were laid. Prospects are for a moderate population of aphids next spring. (W. C. Cook, BEPQ).

Pea aphid infestation in the Palouse district of Idaho and Washington was not serious in 1951. Early surveys of alfalfa and peas indicated the presence of overwintered aphids in the area and these spread rapidly to practically all sections of the Palouse district but failed to increase to serious levels. There were some indications that the pea aphid was moving from the Snake River Canyon and the areas near the canyon rim into the Palouse district. (R. Schopp, BEPQ).

In Wisconsin, the pea aphid infestation on alfalfa was moderate during the fall of 1950 but on account of cool weather during the spring of 1951, the overwintering eggs of the pea aphid were about two weeks late in hatching. Owing to a continuation of abnormally cool weather during June, the aphid population increased slowly on peas and it was the middle of June before the infestation became sufficiently severe in a few isolated pea fields to warrant the application of insecticides. Despite these conditions the pea canners started insecticide applications on peas before the middle of June and by the end of the first week in July nearly two-thirds of the pea acreage in southern and central Wisconsin had been treated. By mid-July the pea aphid was no longer a problem on peas for 1952 in the southern part of Wisconsin since such a large part of the acreage had received effective and timely insecticide treatment. (J. E. Dudley, Jr., and T. E. Bronson, BEPQ).

PEA WEEVIL (Bruchus pisorum (L.))--The pea weevil was more abundant during 1951 in the Blue Mountain district of Washington and Oregon than it has been for several years, with a more extended period of movement from their overwintering quarters to the pea fields. Many pea fields had to be dusted more than once. (W. C. Cook, BEPQ).

PEA WEEVIL infestations were comparatively low in the Palouse district of Idaho and Washington during 1951. Infestation data from only 56 officially sampled crops of peas are available from this district. These records show an infestation of 0.9 percent for 1951. This indicates a gradual increase in infestation in the district since the record low of 1949 when 0.4 percent was recorded. It is probable that a sufficient number of weevils entered hibernation in the fall of 1951 to cause apprehension in 1952 unless severe weather occurs during the winter of 1951-1952. The overwintering infestation indicates about a 50 percent increase in the number of weevils in hibernation as compared to the winter of 1950-1951. (Ralph Schopp, BEPQ).

In Utah, the pea weevil population on canning peas was more widespread and generally higher in 1951 than in preceding years. The delayed spring caused the weevil to emerge from its overwintering quarters over an extended period. (H. E. Dorst, BEPQ).

The pea weevil occurred in light to moderate numbers in some localities of central New York and in southern Idaho during June and July. (G. J. Haeussler, BEPQ).

SALT-MARSH CATERPILLAR (Estigmene acrea (Drury))--The salt-marsh caterpillar occurred in outbreak numbers from September to November 1951 in the Salt River Valley of Arizona. This insect breeds in cotton in this area and the fourth- and fifth-instar caterpillars move late in the summer and fall from the cotton fields to fall vegetables, sugar beets grown for seed, alfalfa, and small grains. Lettuce, carrots, cauliflower, broccoli, and cabbage are among the fall vegetable crops susceptible to injury. Insecticides are relatively ineffective against the moving caterpillars primarily because of the continuous influx of large numbers. This is especially true of fall vegetables and sugar beets grown for seed which are in the early stages of development at that time of year. However, in most cases injury was prevented by the construction of barriers around fields threatened with invasion. The caterpillars could be controlled in cotton but since it causes but little damage to this crop, the cotton farmer in most cases is not interested. The caterpillars are attacked by several species of parasites in this area of which two species of tachinid flies are of prime importance, but parasitization by these insects was at a very low level during the fall of 1951. The chemical control program used against other insects in cotton is ineffective against the salt-marsh caterpillar but is detrimental to the parasites, which may in part account for the low degree of parasitization. (O. A. Hills and E. A. Taylor, BEPQ).

During 1951, the salt-marsh caterpillar was also reported as attacking beans in Delaware, Virginia and California; cabbage in the latter two states; spinach and strawberries in California; and castor beans in Arizona. (G. J. Haeussler, BEPQ).

PICKLEWORM (Diaphania nitidalis (Stoll))--In the Charleston, S. C., district the first pickleworm of the 1951 season was found on May 18, which is only a little later than usual. The infestation, however, remained very light until after the middle of July. The insect was of no importance on commercial spring season plantings of squash and cucumbers. Squash was severely damaged during midsummer. Cucumbers grown during the fall season suffered little damage in most cases until after October 20, which was about half way through the harvest period. Considerable damage occurred after this time and as high as 52 percent of the fruits harvested from experimental plots not treated with insecticides were wormy. Squash was infested much earlier in the fall and received more damage than the cucumbers. (W. J. Reid, Jr., and F. P. Cuthbert, Jr., BEPQ).

In addition to South Carolina, the pickleworm, often associated with the melonworm, was reported causing damage at various times during 1951 in parts of Virginia, Georgia, Florida, Alabama and Tennessee. (G. J. Haeussler, BEPQ).

MELONWORM (Diaphania hyalinata (L.))--In the Charleston, S. C. district the melonworm was not found until September 4 and remained relatively scarce during the remainder of the season. (W. J. Reid, Jr., and F. P. Cuthbert, Jr., BEPQ).

CUCUMBER BEETLES--In South Carolina, the banded cucumber beetle (Diabrotica balteata Lec.) was much less abundant than usual during the spring and summer of 1951 but caused moderate damage to some snap beans in the fall. This insect along with the striped cucumber beetle (Acalymma vittata (F.)) and the spotted cucumber beetle (Diabrotica undecimpunctata howardi Barb.) was abundant enough to require insecticide applications on young fall cucumbers. The striped cucumber beetle was also quite destructive in some plantings of spring cucumbers in South Carolina and Indiana. The spotted cucumber beetle caused slight damage to lettuce, spinach, cabbage and young turnips in South Carolina during April. (W. J. Reid, Jr., and F. P. Cuthbert, Jr., BEPQ).

ONION THRIPS (Thrips tabaci Lind.)--Larvae of the spring generation of the onion thrips were first observed in alfalfa and clover on April 17, 1951, which is near the normal date of their appearance in southern Idaho. On the Southport Yellow Globe variety, the population averaged 0.6 thrips per plant on June 22. The population gradually increased until the first seasonal peak was reached on July 31, when 55.1 thrips per plant were recorded. Following this date, the population decreased to 10.7 thrips per plant by August 7. The second seasonal peak occurred soon thereafter, when 49.2 thrips per plant were recorded on August 14. Cool weather during the last of June and the first half of July retarded development of thrips so that the population on White and Yellow Sweet Spanish varieties of onions, the commercial varieties grown in southern Idaho, was below that of 1950 and considerably below the 7-year average. Since the thrips population was low and its peak later than normal, the injury to commercial onions was very light in 1951. The general use of insecticides for the control of alfalfa and clover insects has evidently reduced the general thrips population on all plants in this area. (F. H. Shirck, BEPQ).

Moderate to heavy injury by the onion thrips occurred at various times during 1951 on onions, shallots, garlic and related crops throughout parts of the coastal districts extending from New York to Louisiana and in Tennessee, Ohio, Wisconsin, Colorado, Utah, Idaho and California. (G. J. Haeussler, BEPQ).

PEPPER WEEVIL (Anthonomus eugenii Cano) --Pepper weevil infestations were very light or absent in Ventura, Los Angeles and Orange Counties, California during 1951. A few fields became infested in San Diego County, but the infestation did not become severe until late in the season after the main crop had matured. (R. E. Campbell, BEPQ).

BEET LEAFHOPPER (Circulifer tenellus (Bak.))--In Idaho, the beet leafhopper population that entered the winter of 1950-51 was the second largest since 1940, and the leafhoppers entered the winter under favorable conditions. Spring surveys in 1951 showed that the overwintered beet leafhopper population averaged 29 females per 100 square feet of weed-host area, as compared to an average of 27 for the past 10 years. The spring surveys in southwestern Idaho showed that the spring and summer weed-host plants of the beet leafhopper were widespread, abundant, and in good condition over most of the area. The summer weed-host plants germinated and emerged during the last half of February 1951 but were killed during the cold period the first week of March. Additional germination and emergence occurred about March 20. Cool, dry weather in March and April delayed the early seasonal growth of weed hosts, but warm weather and adequate moisture in May resulted in good growth for both weeds and downy chess (Bromus tectorum L.), which increased the competition between the weed-host plants and this fall-germinating, spring-maturing annual grass. This competition was so great that Russianthistle (Salsola kali var. tenuifolia Tausch) over thousands of acres of range land was choked out. The movement of the spring generation leafhoppers into beetfields on the western edge of the Twin Falls, Idaho, irrigation tract started on May 29 and reached the peak on June 28, when the average population was 393 leafhoppers per 100 square-foot samples. The peak population was 401 less than the 17-year average of 794 adult beet leafhoppers per 100 samples. The population at the peak was much lower than normal, since about 6,300 acres of the more productive spring breeding areas were sprayed for the control of the beet leafhopper. The initial movement was 5 days and the peak 6 days later than the 17-year average. Heavy flights occurred from June 11 to 20, when 77 percent of the incoming leafhoppers entered the fields in 12 days. Tests of spring-generation leafhoppers from beetfields in the Buhl-Castleford district showed 63 percent carrying the virus of the curly-top disease. Surveys of representative fields of garden beans grown for seed in southern Idaho showed that 3.9 percent of the plants were infected with curly top, while only 1.4 percent of Great Northern U. I. 123 beans were infected. In western Idaho-eastern Oregon and southcentral Idaho, 31.4 and 5.3 percent of the sugar-beet plants showed obvious curly-top infection. Surveys in September 1951 showed the largest acreage of Russianthistle since 1936. This plant is the most important summer host of this leafhopper in Idaho. The important increases of Russianthistle acreages in 1951 over 1950 occurred in the Golden Valley, King Hill, and Mountain Home districts. These increases were on range land where sagebrush

(Artemisia tridentata Nutt.) had been burned. The number of leafhoppers that entered the winter of 1951-52 was the second highest since 1940, and they entered the winter under favorable conditions. (J. R. Douglass, BEPQ).

The beet leafhopper occurred in sufficiently large numbers to be of economic concern in some cantaloup fields in the Salt River Valley of Arizona during the spring of 1951, but curly top disease was of minor importance on this crop. Migrations were later than last year, occurring mostly between April 11 and May 16 whereas in 1950 the heaviest migrations occurred between March 20 and April 12. For this reason plants in most fields were more advanced in development at the time of migrations than they were in 1950. Recent experiments have shown that cantaloup plants in the four-leaf stage are much more resistant to curly top-infective leafhoppers than are cotyledon or two-leaf plants and that plants in the six-leaf stage or larger are rarely injured. Also, the main source of leafhoppers was from surrounding desert areas in 1951 whereas in 1950 the principal source was from uncultivated areas along the Salt River. This undoubtedly had an effect on the percentage of virus-carrying leafhoppers entering the cantaloup fields and may also have had an effect on the potency of the virus. (O. A. Hills and E. A. Taylor, BEPQ).

In the breeding areas of the beet leafhopper in southern Utah, southern Nevada, southeastern California, and southern and western Arizona, there was an average of 0.015 leafhoppers per square foot of weed hosts in February 1951 as compared to averages per square foot ranging from 0.016 to 0.07 during the preceding 7-year period. The overwintering leafhopper population in the local breeding areas adjacent to Great Salt Lake and Utah Lake averaged 0.001 per square foot compared to averages per square foot ranging from 0.006 to 0.023 during the preceding 7-year period. The condition of the wild host plants was poor in these local breeding areas. Migrant leafhoppers from the southern breeding area were observed in central Utah during the middle of May and in northern Utah during early June. The leafhopper movement from the northern breeding area was too small in numbers to be considered important. The population of the leafhoppers on sugar beets averaged 0.07 per square foot as compared to averages ranging from 0.02 to 0.51 during the preceding 7 years. The percentage of leafhoppers carrying curly top virus was very low. No curly top disease was observed on sugar beets except in the extreme southern part of the cultivated area where an average of 0.06 percent of the plants were infected. (H. E. Dorst, BEPQ).

SUGAR-BEET ROOT MAGGOT (Tetanops myopaeformis (Roeder))--The outbreak of the sugar-beet root maggot on sugar beets that started in southern Idaho during 1949 continued through 1951, requiring insecticide

applications to about 600 acres of beets in that section. The infestation varied from field to field, depending upon the nearness of the beetfield to the source of infestation. The percentage of beets injured reached a maximum of 98 percent, and in some fields from 80 to 90 percent of the sugar beets were killed. (J. R. Douglass and E. W. Jones, BEPQ).

RED-BACKED CUTWORM (Euxoa ochrogaster (Guen.))--This cutworm caused serious injury during 1951 to some fields of sugar beets and onions in southern Idaho. The most severe injury occurred in fields where potatoes were planted during the preceding year. (J. R. Douglass, BEPQ).

SWEETPOTATO WEEVIL (Cylas formicarius elegantulus (Summers))--The sweetpotato weevil was not so widespread in 1951 as in 1950. Surveys during 1951, disclosed infestations in 66 counties in the states of Alabama, Florida, Georgia, Louisiana, Mississippi, South Carolina and Texas, as compared with 76 counties in 1950. Weevil incidence in the infested areas in 1951 was approximately 46 percent less than in 1950, with considerable decreases in general abundance. A slight spread was noted in a few localities. (W. G. Bruce, BEPQ).

APHIDS ON TOBACCO--Aphids consisting principally of the green peach aphid (Myzus persicae (Sulz.)), were widely distributed on tobacco in Florida, Georgia, and South Carolina and to a lesser extent in North Carolina, Tennessee, Maryland, and Wisconsin during 1951. They began to appear in Florida in potentially serious numbers during the latter part of March and were reported from other areas as the season advanced. The infestation in most states appeared to be quite similar to that in 1949 and 1950 although this aphid was more abundant in the Florida-Georgia area in 1951 than during the preceding two years. Severe damage rarely occurred, but there were some instances of large increases in population despite the use of insecticides. In general, large quantities of insecticides are being used against these aphids during the early season because the tobacco growers realize that they are an annual pest and are potentially dangerous in any year. The intensive use of insecticides, practically eliminated aphids on shade-grown tobacco in the Florida-Georgia area. (N. Allen and F. S. Chamberlin, BEPQ).

The 1951 aphid infestation on tobacco in northcentral Tennessee did not exceed 5 percent of the 1950 population. The low infestation during 1951 apparently resulted in part from unusually low temperatures in November 1950 (-2° F.) and in February 1951 (-13° F.). It was not necessary to use insecticides for aphid control in this area at any time during the season. Predators were present throughout the growing season, but not in numbers

sufficient to control an aphid infestation on tobacco. A disease, probably Entomophthora aphidis Hoffm., was present throughout the season but there was no evidence that it reduced the aphid infestation in tobacco materially. The infestation in the fall of 1951 was extremely light. Practically no individuals of the green peach aphid are overwintering (1951-52) on wild hosts in northcentral Tennessee. (L. B. Scott, BEPQ).

A survey in 28 tobacco fields of Dane County, Wisc. late in August 1951 revealed a light infestation of the green peach aphid in most fields. There was a heavy aphid population in parts of one field and many of the affected plants were severely injured. (J. E. Dudley, Jr., BEPQ).

A survey in the fields of perique tobacco in St. James Parish, La. disclosed a light aphid infestation on the tobacco. (K. L. Cockerham, BEPQ).

TOBACCO BUDWORM (Heliothis virescens (F.))--This pest was abundant on tobacco during 1951 in the flue-cured areas of Georgia, Florida, South Carolina, and some sections of North Carolina throughout the season. It was not as numerous in Maryland, but was present during August. The species was very abundant in Tennessee and adjacent areas where dark fire-cured tobacco is produced. Practically all tobacco fields sustained light to moderate injury. A greater potential degree of injury was decreased by large-scale applications of insecticides. (N. Allen and L. B. Scott, BEPQ).

HORNWORMS ON TOBACCO (Protoparce sexta (Johan.) and P. quinquemaculata (Haw.))--Hornworm larvae were fairly plentiful on tobacco in Florida and South Carolina by the latter part of May and the first of June in 1951. At that time the infestation was light in Georgia. There was a light infestation in all districts reporting in Georgia and Florida by the last of June. By the middle of July the worms were appearing in large numbers in South Carolina and some sections of North Carolina, but the population was light in Georgia and Florida. By the first of August larvae were numerous in South Carolina and parts of North Carolina, fairly abundant in Maryland, Tennessee and Delaware, but scarce in Florida and some sections of Georgia. Heavy infestations did not develop in Maryland and Tennessee until late in August and early in September. (N. Allen, BEPQ).

Hornworms in 1951 were more abundant in northcentral Tennessee than they had been for several years. Light to moderate injury occurred in all plantings of tobacco. Trap records show that hornworm moths were moderately abundant throughout the growing season but the hornworms did not appear in destructive numbers on tobacco until early August. Extensive

applications of insecticides prevented serious hornworm damage. Parasites, especially Apanteles congregatus Say, attacked hornworm larvae on dark fire-cured as well as on burley tobacco. In previous years only larvae on burley tobacco were destroyed in large numbers by this parasite. (L. B. Scott, BEPQ).

TOBACCO FLEA BEETLE (Epitrix hirtipennis Melsh.)--In Florida, Tennessee, and Delaware the infestation of the tobacco flea beetle on tobacco was light to moderate during 1951. In North Carolina the infestation was especially severe on newly-set plants. In South Carolina the beetles occurred in outbreak numbers soon after the plants were set and caused considerable damage. Large numbers also occurred on many of the farms in this State during July when the plants were full-grown. Reports from growers at that time indicated that two to three leaves per plant had been destroyed by the beetles. The infestation in South Carolina in 1951 was nearly as severe as the one experienced in 1938 when the beetles caused widespread concern. Growers lost thousands of dollars from the outbreak in 1951 and if DDT had not been available the losses would probably have been greater. (N. Allen, BEPQ).

FOREST INSECTS

See The More Important Forest Insects in 1951 - A Summary. Cooperative Economic Insect Report, Vol. 1. Special Report No. 4, February 15, 1952.

COTTON INSECTS

BOLL WEEVIL (Anthonomus grandis Boh.)--Large numbers of boll weevils entered hibernation in the fall of 1950, but as a result of an extremely cold winter during 1950-1951 fewer weevils survived and entered cotton fields in the spring of 1951 than during the two previous years. The survey of boll weevil distribution, abundance, and damage during the 1951 growing season showed that the weevil survived the winter in sufficient numbers to cause serious damage in most areas where it occurred in 1950. It survived throughout Oklahoma and Arkansas, and also in parts of Tennessee, and Missouri. However, owing to the wide use of insecticides early in the season and hot, dry weather during July and August, damage to the 1951 cotton crop was less serious in most areas than in 1949 and 1950, and may average less than in any recent year. (T. P. Cassidy, BEPQ).

BOLLWORM (Heliothis armigera (Hbn.)--Comparatively light damage to the cotton crop by this insect occurred in 1951, although serious outbreaks were reported, especially in Arizona, Texas, Oklahoma, Louisiana, Arkansas, and Mississippi. The heavy poisoning schedule maintained for boll weevil control apparently held the bollworm in check in most areas. On May 2, threatening infestations were reported in the Lower Rio Grande Valley of Texas, but serious infestations did not develop. During the third week of June infestations of lepidopterous larvae, principally the bollworm (H. armigera) and the tobacco budworm (H. virescens (F.)) were reported in many areas in Mississippi. By the latter part of the month, light infestations had been reported from most of the cotton-growing states; and report of light infestations were received from states during July and August. On the whole, the bollworm infestations in the central and south-central Texas area where serious infestations usually occur was light. (T. P. Cassidy, BEPQ).

LEPIDOPTEROUS LARVAE on cotton -- Among the other insects that were notably abundant during 1951 were several of the lepidopterous larvae, expecially the tobacco budworm (Heliothis virescens (F.)), the yellow-striped armyworm (Prodenia ornithogalli Guen.), the fall armyworm (Laphygma frugiperda (A. & S.)), the beet armyworm (L. exigua (Hbn.)) and the garden webworm (Loxostege similalis (Guen.)). The first three of this group not only feed upon the foliage of cotton, but are also "bollworms" and cause damage that is very similar or identical to the injury caused by the bollworm (H. armigera (Hbn.). (T. P. Cassidy, BEPQ).

COTTON LEAFWORM (Alabama argillacea (Hbn.))--The cotton leafworm caused little or no damage to the cotton crop in 1951. The first report of the leafworm was received from Cameron County, Tex., July 17. By September 1, infestation had been reported from three additional counties in Texas and one county in Florida. With the exception of a few fields in south Texas no infestation developed to require insecticidal control. Many insecticide formulations used in the control of other insects give satisfactory control of the cotton leafworm. Arsenical insecticides have long been used effectively against the cotton leafworm. Many of the new organic insecticides now in use for cotton insect control are effective against the cotton leafworm. (T. P. Cassidy, BEPQ).

COTTON FLEAHOPPER (Psallus seriatus (Reut.))--Early-season inspection for the cotton fleahopper in central Texas was begun during the last week of May and was continued through the week ending August 25. The general cotton insect survey conducted in 12 cotton-growing states included specific counts on the cotton fleahopper and infestations were unusually light throughout the growing season of 1951 in all 12 states. The heavy poisoning schedule maintained for boll weevil, thrips, bollworm and other

cotton insects apparently helped to hold the cotton fleahopper in check in most areas. (T. P. Cassidy, BEPQ).

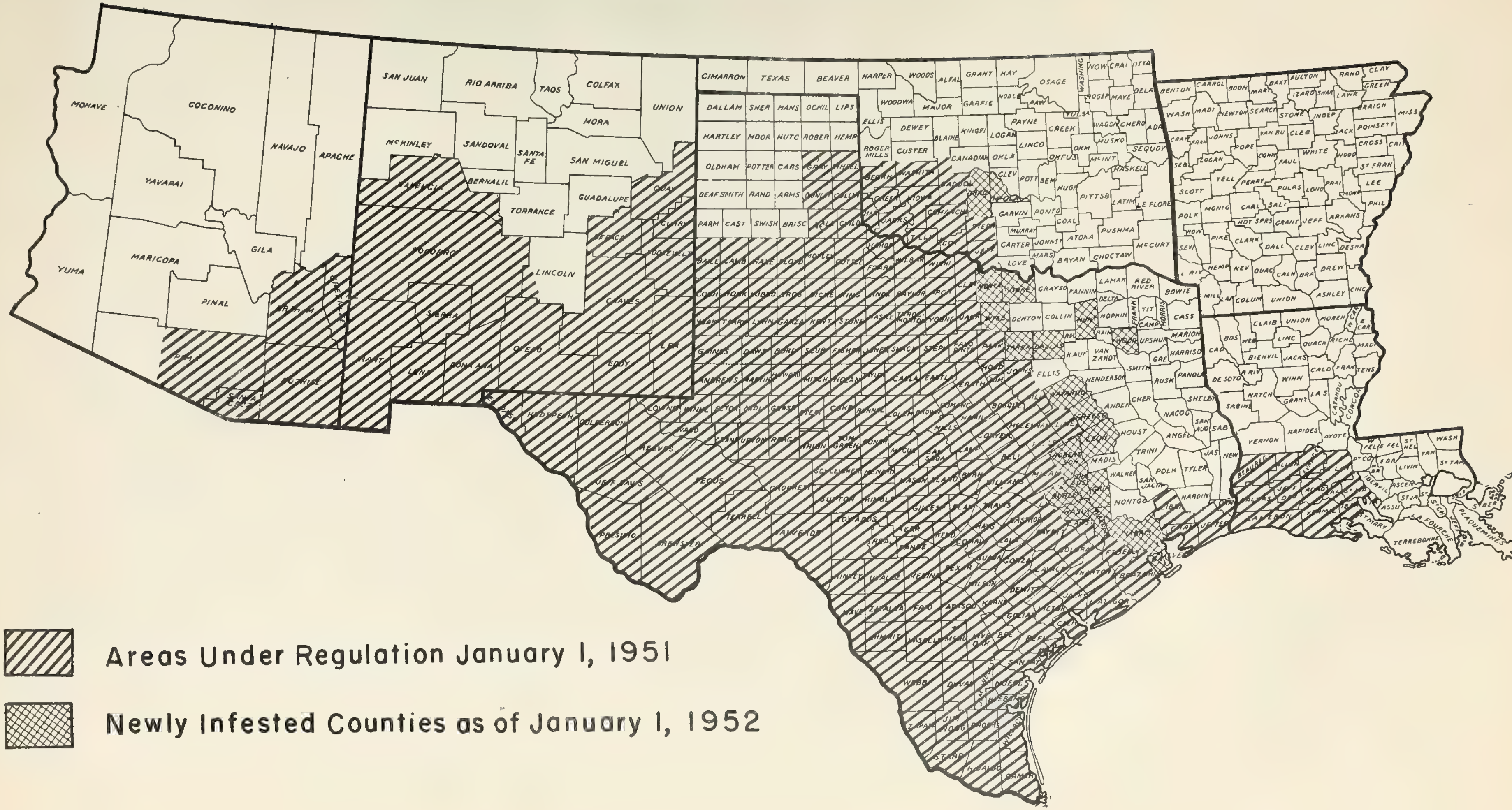
COTTON APHID (Aphis gossypii Glov.)--Cotton aphids are not as important as they were from 1920 to 1945 because aphid damage to cotton has been greatly reduced by the general substitution of organic insecticides for calcium arsenate. Aphid infestations were studied during 1951 in large-and small-scale field insecticide experiments conducted in five states for control of the boll weevil and other cotton insects. Thirty-one formulations of organic insecticides were included in the tests and in no case did aphids become a serious problem following the use of these formulations until it was necessary to use DDT for the control of the bollworm or tobacco budworm. The addition of benzene hexachloride, lindane, tetraethyl pyrophosphate or parathion to the formulation corrected the trouble and prevented further aphid build-up. (T. P. Cassidy, BEPQ).

SPIDER MITES--Although several species of spider mites are known to attack cotton, two are believed to be of greatest importance as cotton pests, the two-spotted spider mite (Tetranychus bimaculatus Harvey) and a recently described species, Septanychus texazona McG. The spider mites long known to the cotton grower as "red spiders" and always recognized as dry weather pests, caused serious damage to cotton in 1951 from the Atlantic to the Pacific. Last summer was one of the driest summers on record in many localities and infestations became serious. It is difficult to determine or measure the damage caused by spider mites because their damage is so closely associated with that caused by drouth. No reliable method has been developed to determine the relative amount of loss caused by these two factors. (T. P. Cassidy, BEPQ).

PINK BOLLWORM (Pectinophora gossypiella (Saund.))--Inspection of the 1951 cotton crop showed a general infestation in many of the regulated areas and some spread eastward in Texas and Oklahoma. Early inspection showed a marked decrease in some counties of southern Texas that were heavily infested in 1950, but later inspections showed a heavy build-up in late-harvested fields and those where field cleanup was delayed. In many other counties in this section the infestation increased, especially in the group of counties along and near the coast north of Corpus Christi. Inspection of material collected since field cleanup indicates there will be a tremendous carry-over for the 1952 cotton crop. In some counties pink bollworms were found in every field inspected. Infestations were lighter than in 1950 in western Texas, the plains area and New Mexico. Only two of the regulated counties of southwestern Oklahoma were infested as compared to 8 in 1950. Graham County, Ariz. was infested this year, the first finding in the state since 1948. The heavier infested area of southwestern Louisiana in 1950 was in a noncotton zone during 1951. However,

PINK BOLLWORM REGULATED AREAS

JANUARY 1, 1952



Areas Under Regulation January 1, 1951

Newly Infested Counties as of January 1, 1952

Vermilion Parish was found infested again this year. Seventeen Texas counties outside the quarantined area were found infested in 1951. For the majority of the counties, this was the first time that infestation had been found. However, Robertson County, one of the group, was the seat of the first infestation in the United States in 1917. These counties either adjoin the quarantined area or are connected by counties found infested, with the exception of Hunt and Wood. Pink bollworms were found in two counties in Oklahoma outside, but adjacent to the quarantined area. (See Map).

Inspections in California, Arkansas, Mississippi, Alabama, Georgia, and cultivated cotton in Florida were negative. (L. F. Curl, BEPQ).

INSECTS AFFECTING MAN AND ANIMALS

SCREW-WORM (Callitroga americana (C. & P.))--The mild winters of 1948-49 and 1949-50 resulted in a winter survival of screw-worms over a larger area in the Southeast than had been previously known. Following these mild winters, greater damage occurred over a correspondingly larger area. A reversal of weather conditions occurred during the winter of 1950-51. Severe low temperatures caused a receding of the winter-survival area in the Southeast to below Cocoa and Tampa, Fla. The small winter-survival area, the low fly-incidence, and the late spring followed by prolonged drouth contributed to a minimum of damage during 1951. As a result of the slow build-up and migration northward of flies, only a comparatively small area became infested. The northern limits reached during 1951 in the Southeast was just north of the State of Florida, and in most instances these were isolated cases.

The screw-worm infestation throughout the western area of the United States in general was lighter than in the past few years. However, in certain areas, particularly in the irrigated farming areas of New Mexico, Arizona, and California, the infestation was considered about normal. Few screw-worm cases and little damage were reported from the Flint Hills area of Kansas, which was quite unusual. In none of the areas surveyed were the infestations considered heavy; and the damage incurred was below normal, except as noted. This condition in general might be attributable in part to the low temperatures which caused a receding southward of the winter-survival area in Texas and the slow spring build-up and northward migration of flies. Little or no damage was reported in Oklahoma and to a lesser degree in Missouri and Kansas.

An infestation of screw-worms in cattle shipped to Fort Pierre, S. Dak. early in the spring apparently was stamped out by thorough and rapid

treatment of the infested wounds by local State authorities, as no other infestations were reported from that State.

In all areas surveyed, adequate remedial supplies were available. The screw-worm remedy, EQ-335, developed at the Kerrville laboratory resulted in excellent control of screw-worms when opportunity afforded its use. (C. L. Smith, BEPQ).

HORSE FLIES (TABANIDAE)--In cooperation with the Agricultural Extension Service of Louisiana, a survey of Tabanidae was made in 31 parishes. Twelve species, representing four genera were collected. Tabanus lineola F. was the most important species present. Although the tabanid infestation was general throughout the State, the infestation was not considered so serious as reported in some years. (C. L. Smith, BEPQ).

IMPORTED FIRE ANT (Solenopsis saevissima richteri Forel)--Prior to the surveys of 1950 the imported fire ant was known to occur only in western Florida, southwest Alabama, and southeast and centraleast Mississippi. Subsequent surveys revealed much larger infested areas. Through the year 1951 infestations were found in 89 counties and parishes in 9 southern states.

The 1951 survey included 4 main points as follows: (1) Investigating new infestations, (2) Delimiting old infestations to determine rate of spread, (3) Estimating damages caused, and (4) Disseminating information and giving demonstrations on control.

Many new infestations were found by inspecting nurseries outside of the larger infested areas of southwest Alabama and southeast Mississippi. Nurseries were inspected because several isolated infestations were found in nurseries which were very distant from the Alabama-Mississippi areas. These inspections revealed 3 counties in Arkansas, 5 in Florida, 1 in South Carolina, 9 in Georgia, 6 in Louisiana, 1 in Tennessee, and 3 in Texas, to be infested.

The severe cold winter of 1950-51, apparently, did not adversely affect imported fire ant infestations. However, the excessive drouth during the spring and summer of 1951 in central east Mississippi seemed to have impeded migration there. In all other areas surveyed the distance of spread was approximately 3 miles in all directions. The increased area infested extended into several new counties and parishes.

Imported fire ants caused considerable damage to certain truck crops such as corn, collards, cabbage, eggplant, potatoes and okra. Figures were obtained to show actual damage to 75 acres of okra planted in Mobile and Baldwin counties. Ala. On this crop alone, the damage was $6,982.00. This insect attacks, also, newly born farm animals, and certain forms of wild life which rear their young on the ground. Furthermore, laborers are deterred from their work in infested fields because these ants inflict a very painful sting resulting in a pustule and sore. In pastures and meadows the large mounds of the ant interfere with the operation of mowing machines and combines. (G. H. Culpepper, BEPQ).

INSECT CONDITIONS IN PUERTO RICO IN 1951 BY G. N. WOLCOTT

The bright blue Chrysomelid beetle, Leucocera laevicollis Weise, an endemic pest of the West Indian Cherry or "Acerola", Malpighia punicifolia L., previously reported by Mr. H. K. Plank in the Mayaguez (Federal) Agricultural Experiment Station Report (1940-116) as defoliating trees at Mayaguez in April 1939, became epidemic on trees at the Isabela Sub-Station in December 1951. This is only a local outbreak, however, as no beetles have been found in an extensive plantation at the Experiment Station at Rio Piedras or in scattered trees at Mayaguez.

The cotton leafworm, Alabama argillacea Hbn., was noted in small numbers on the high cotton at the Seed Farm at Lajas, in southwestern Puerto Rico in January 1952.

The citrus rosetting aphid, Aphis spiraecola Patch, had caused numerous rosettes on orange trees at the Lajas Sub-Station, where rainfall had been reasonably abundant during the last few months, and was present in numbers on new flushes of growth, in early January 1952. Extensive feeding by May beetles, Phyllophaga vandinei Smyth, and the weevils, Diaprepes abbreviatus L., on these orange trees had occurred late in 1951, but was of negligible economic importance because of vigorous foliage production at that time.